

# EXHIBIT A

# MUELLER

## MI.NET<sup>®</sup> NODE LoRaWAN<sup>®</sup> Class B Meter Interface Unit

### FEATURES

**Two Way Communications:** The Mi.Net<sup>®</sup> LoRaWAN (LW) meter interface unit from Mueller Systems, provides a direct connection to all Mueller water meters equipped with an encoder register. The primary function of the Mi.Net LW node is to provide two way communications between the LoRaWAN Network Provider and the meter.

**System Components:** Information retrieved from a water meter is stored temporarily within the node's non-volatile internal memory. As a default, the Mi.Net LW node will transmit hourly meter data at a predetermined time once per day to the network. On demand reads can be requested at any point in time and are typically delivered within seconds. The Mi.Net LW node is designed to provide features specifically needed to support low cost, secure bi-directional communications for IoT, including Smart City applications.

**Construction:** The Mi.Net LW node unit incorporates multiple moisture barriers to address concerns over moisture intrusion even in meter box environments. An o-ring sealed thermoplastic enclosure, coated electronic board and potting compound provide a water resistant package that permits Mueller Systems to offer a 20 year warranty on the Mi.Node unit. A large lithium ion battery provides plenty of power over the life of the unit.

**Scalable and Upgradable:** The Mi.Net LW node's functionality can be upgraded remotely. Mueller proprietary firmware allows the Mi.Net LW node to be upgraded autonomously. The Mi.Net system integrated with the Mi.Net LW node can be scheduled for an upgrade at one time and the system will notify the user when the process is complete.

The Mi.Net LW node seamlessly connects directly to the Mueller Systems 420RDM (Remote Disconnect Meter) for easy and secure actuation of the valve through the Sentryx<sup>™</sup> Water Intelligence user interface.



### MATERIALS AND SPECIFICATIONS

Class B LoRaWAN<sup>®</sup> compatible for fast response times, on-demand reads in seconds, not hours

Interfaces with water meters that output a protocol same to the Mueller Systems Solid State Register

Logs and stores up to 511 days of hourly data in internal memory

RF antenna contained inside Mi.Node unit enclosure

FCC compliant

Mi.Net LW Node wire lengths to Mueller register: 5': 25'

Power Output: 1W

Power Source: D Cell Lithium Battery

Transmit Frequency: 902 MHz – 928 MHz

Data Integrity Verified with every data message

Temperature Range: -40°F to + 158°F (-40°C to + 70°C)

Humidity: 0% - 100% condensing

Dimensions: 6 5/8" high x 2 15/16" wide x 3 3/8" deep

Automatically detects encoder meter type connected

No external power supply required for operation

Notifies the system of low battery level for preemptive maintenance

Tamper and leak notification

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# EXHIBIT B

**MUELLER**

# MI.NET<sup>®</sup> NODE

## LORAWAN<sup>®</sup> CLASS B METER INTERFACE UNIT

Leveraging the Low Power, Wide Area Network (LPWAN), the Mi.Net<sup>®</sup> LoRaWAN (LW) node is the water industry's first Class B LoRaWAN radio transmitter - capable of delivering the fastest two way wireless communication without compromising battery life.



# MUELLER

Water utilities are challenged to meet greater public demand, reduce cost and consumption, optimize resources and efficiency, and provide unparalleled customer service. The Mi.Net® LoRaWAN® (LW) node supports the digital transformation of smart water operations by helping utilities go beyond automated reading and improve utility efficiency with advanced metering infrastructure (AMI) based on Low Power Wide Area (LPWAN) network protocol.

The Mi.Net LW node is the only solution in the water metering industry that delivers the fastest two-way wireless communication with an unparalleled level of flexibility for long term deployment – all without compromising battery lifespan.

Implemented with LoRaWAN Class B mode, the Mi.Net LW node permits data to be collected and transmitted remotely within seconds. This effectively streamlines operations and reduce cost, which results in a quick return on investment.

## FEATURES



### SYSTEM FEATURE

The node transmits water meter data to the LoRaWAN network daily, via an unlicensed radio frequency.

On-demand reads to the node can be requested and delivered within seconds.



### CONSTRUCTION

Fully encapsulated design – eliminating any possible pathways for moisture intrusion.

This AMI endpoint is design to survive life inside the meter pit and be subjected to the harshest of conditions.



UPDATING...

### SCALABLE & UPGRADABLE

The node's functionality allows for upgrade to be performed remotely and autonomously.

All units can be upgraded at one scheduled time and the system will notify the user when the process is completed.

O-ring sealed thermoplastic enclosure, coated electronic board and potting compound provide a watertight package to prevent moisture intrusion

Besides consumption data, alerts such as leak detection, no flow, reverse flow, register removal, low battery alarm and more, are constantly monitored

Provides a direct connection to all Mueller water meters equipped with an encoder register

Seamlessly connects directly to the Mueller Systems Model 420 Remote Disconnect Meter (RDM) for easy and secure valve actuation through the user interface



## BENEFITS



### FAST END TO END RESPONSE TIME

Unlicensed spectrum system that allow signals to move through fewer or no mid-point nodes, swiftly to its destination. Reduced delayed time attribute to identifying outage information quicker.



### REMOTE DISCONNECT ENABLED COMPATIBILITY

Eliminate the need for truck rolls; the node is compatible with Mueller Systems 420RDM. Utilities can remotely initiate a command to turn water service on or off.



### 20 YEAR LIFE

LoRaWAN mitigates battery life issues through addition of gateways. The Mueller node is designed to include a large lithium battery that provides plenty of power and warrants for a 20-year life inside the meter pit.



### SECURITY

LoRaWAN employs two layers of strict security measures. With network security, it ensures authenticity of the node in the network, while the application layer of security ensures the network operator does not have access to the end user's application data.



### OPEN STANDARDS

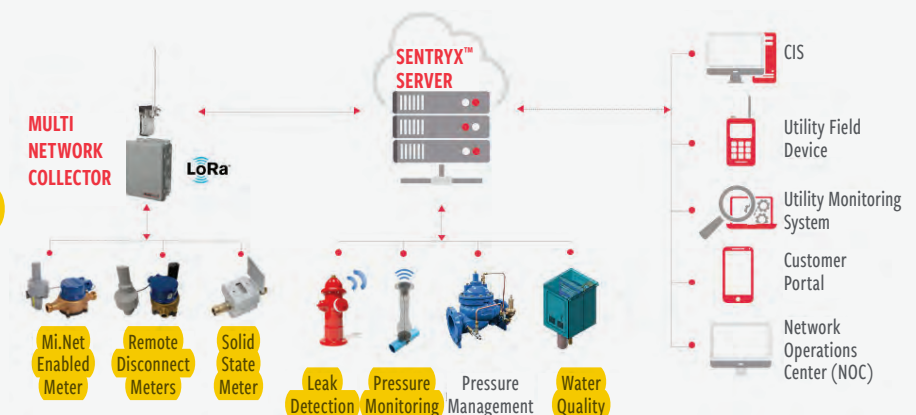
Flexible to deploy, scale and/or leverage private and public networks in a cost-efficient manner, along with interoperability at the network and device levels. Beyond AMI, utilities can go further to implement other smart city initiatives.

## MUELLER SMART WATER INFRASTRUCTURE NETWORK

The Mi. Net system, supported by Mueller Sentryx™ Water Intelligence platform, delivers a robust and secure two-way communication network for transmitting meter data and infrastructure management information.

The connectivity of Mi.Net LW nodes, meters, distribution infrastructure and control devices in a single smart water network enables:

- business operation efficiency
- progressive customer service
- active water management programs

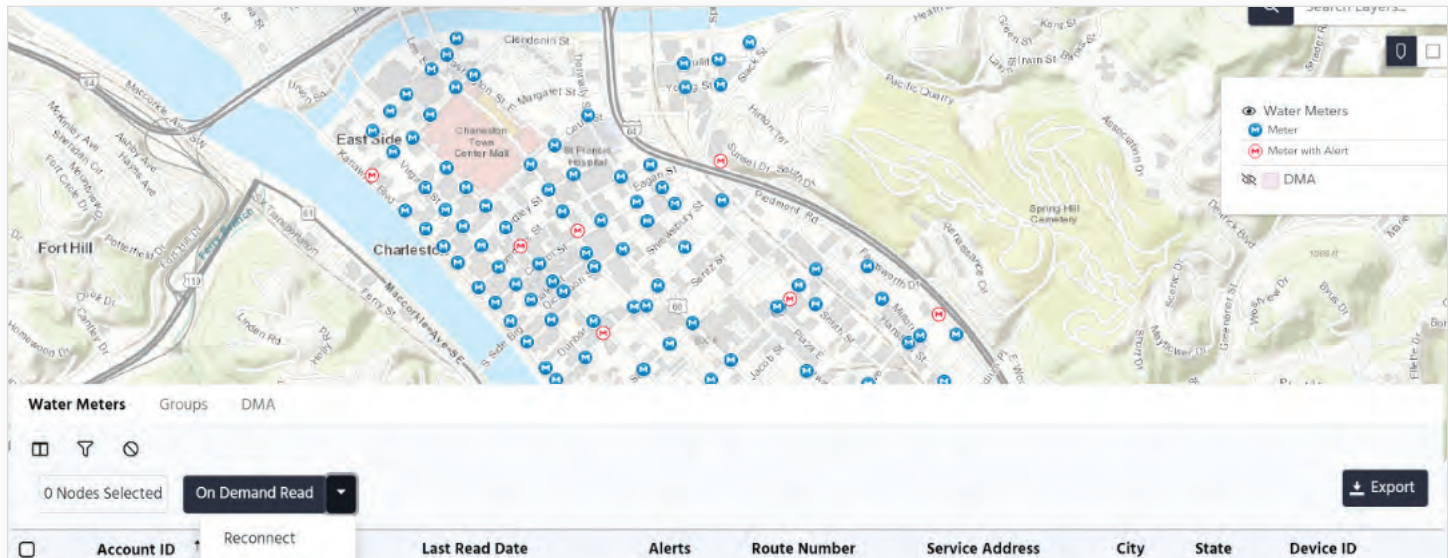


## CASE STUDY

The Town of Florence's comprehensive Smart City Agenda for infrastructure and connectivity advancement, not only includes implementation of smart water metering solution, but also technological applications for wastewater, public safety, and more.

To support the smart water metering agenda, Mueller Systems and Ferguson WaterWorks deployed more than 3,000 Mi.Net LW nodes, integrated with Advanced Metering Infrastructure (AMI) system throughout Florence.

Sentryx™ Water Intelligence Platform – Water Meters User Dashboard



*“The deployment of smart meters is accelerating our journey toward digital transformation and the foundation required to build out our smart city grid,”* said Brent Billingsley, Town Manager of the Town of Florence. *“We are confident that this open source network solution will provide new operational efficiencies, enhanced service opportunities and additional revenue streams.”*

Are you ready to meet greater public demand, increase efficiency, and reduce non-revenue water with Mi.Net® LoRaWAN® Class B node? Start a conversation with us today at **800.423.1323** or visit **<https://marketing.muellerwp.com/LWnode>**

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# EXHIBIT C



**MUELLER**



# MI.NET<sup>®</sup> NODE

## LORAWAN<sup>®</sup> CLASS B METER INTERFACE UNIT

Mueller Systems delivers the water industry's first LoRaWAN<sup>®</sup> Class B smart water meter **interface unit** with the new Mi.Net<sup>®</sup> Node. **Bringing the power of two-way communication between the node and the network** down to the seconds, Mueller Mi.Net<sup>®</sup> LoRaWAN (LW) node is truly a game-changer in defining the digital future of our cities.

The Mi.Net<sup>®</sup> LW node uses LoRa<sup>®</sup> network protocol that allows water utilities to enjoy flexible deployment, efficiently **collect data remotely, and streamline operations to reduce water waste and cost.**

Implemented with Class B specifications, the node allows for predictable times scheduled for when the network server can send a downlink to the unit. In contrast, Class A units can send uplinks to the network at any time but only listen for downlinks after sending their uplinks.

## Why Mi.Net<sup>®</sup> LW Node

### Fast End to End Response Time

- Signals between the endpoint and network server move through fewer/ no mid-point nodes –reducing response time from hours to seconds.

### Remote Disconnect Enabled Compatibility

- **Compatible with Mueller Systems 420 RDM, water utilities can remotely initiate a command to turn water service on or off.**

### 20 Year Battery Life

- **Employing LoRaWAN protocol mitigates battery life issues through the addition of gateways. The node is also designed to include a large lithium battery to warrant 20-year life inside the meter pit.**

### Security

- **LoRaWAN by design is very secure—authentication and encryption are, in fact, mandatory; With two session keys, the Network Session Key (NwkSKey) and Application Session Key (AppSKey) to prevent spoofing and eavesdropping.**

### Open Standards

- Flexible to deploy, scale and/or leverage private and public networks in a cost-efficient manner, along with interoperability at the network and device levels. Beyond AMI, utilities can go further to implement other smart city initiatives.

## Key Features

### System Feature

The node transmits water meter data to the LoRaWAN® network, via an unlicensed radio frequency. On-demand reads to the node can be requested and delivered within seconds.

### Construction

Fully encapsulated design – eliminating any possible pathways for moisture intrusion. This AMI endpoint is designed to survive life inside the meter pit and be subjected to the harshest of conditions.

### Scalable & Upgradable

The node's functionality allows for upgrade to be performed remotely and autonomously.



## Compatible with:

Mi.Net® system

Mueller Systems PD Meter



## Mueller Systems and the LoRa Alliance®

### Innovative Solutions for Smart Cities

LoRaWAN® is a Low Power Wide Area Network (LPWAN) specification intended for wireless battery operated devices in regional, national or global networks. It is designed to provide features specifically needed to support low-cost, mobile, secure bi-directional communication for the IoT, including Smart City applications. It is optimized for low power consumption and to support large

# EXHIBIT D

**MUELLER**

# SHAPING THE FUTURE OF SMART CITIES

LoRaWAN® Application





# MUELLER

The Internet of Things (IoT) plays a significant role in enabling a fully interconnected smart cities with intelligent infrastructure, services, devices and systems, to communicate with each other. For example, water sensors communicate **with remote disconnect valves to shut off water service.**

A smart city is one that is effective and efficient in utilizing and optimizing digital technology and intelligent data in a meaningful way to streamline city operations, make informed decisions and deliver an improved quality of life. In order to build a smart city infrastructure, smart cities must enable themselves with an ecosystem of developers, equipment manufacturers, service providers to deliver hardware, software, connectivity and processing capabilities.

## LORAWAN®: FOR A FASTER AND SECURE APPROACH TO NEW APPLICATIONS THAN CUSTOM OR PRIVATE PROTOCOLS

Smart cities connect disparate endpoints that are ubiquitously available indoors and outdoors, even underground, such as waste bins, streetlights, public transport, water network system, etc. What they have in common is a need for secure, available and cost-effective connectivity. Endpoints differ from one another as they perform different and sector-specific tasks. However, the network infrastructure and the data handling are largely the same. Therefore, it is not necessary to reinvent the wheel every time smart cities look to connect a new endpoint.

Unlike other application specific systems, LoRaWAN is an ideal system for smart cities applications. It is designed from the ground up for lower cost; long life systems with greater ease of deployment than other systems.

**LoRaWAN is a Low Power Wide Area Network specification (LPWAN) designed to wirelessly connect battery operated devices to the internet in regional, national or global networks.**

It is designed to provide features specifically needed to support low-cost, mobile, secure bi-directional communication for IoT applications.

A key strength of LoRaWAN is its ability to support large numbers of devices per gateway. Depending on the policy applied and the time allowed on the network per device each day, more than 3,000 devices can be supported. It is important to note that this is not a high bandwidth industry. Assets only need to communicate their locations in order to be tracked.

LoRaWAN devices typically have very long battery life, making them ideal for long term deployments. Some of the use cases are water metering, streetlighting, air quality monitoring, and bin emptying.

## SMART CITY APPLICATIONS USING LORAWAN



LIGHTING



SANITATION



ENERGY



IRRIGATION



WATER



FIRE SECURITY



## MUELLER MI.NET LORAWAN NODE: ACCELERATOR OF DIGITAL WATER TRANSFORMATION

Utilities and municipalities are constantly challenged to meet public demand for efficiency, optimized resources, reduced cost and consumption – all without compromising quality of customer service. Evidently, they are a crucial piece to successful smart cities' development.

Over the last decade, many cities have started riding the wave of IOT, with smart metering serving as a primary application. We have witnessed many success stories along the way. One notable example is the implementation of Mueller Mi.Net AMI system in the City of Sheridan, Wyoming, across more than 10,000 service connections. The city saw an estimated 65% decrease in labor hours and improved daily read to 99.6%.

Giving the Mueller Mi.Net AMI system an added boost is the industry's first LoRaWAN Class B endpoint – the Mi.Net LoRaWAN (LW) node. The Mi.Net LW node is designed to support the digital transformation of smart water metering operations by helping water utilities go beyond automated reading and improve utility efficiency with AMI based on Low Power Wide Area (LPWA) network protocol.

Implemented with LoRaWAN Class B specification mode, the Mi.Net LW Node is the only solution in the water metering industry right now that delivers the fastest two-way wireless communication with an unparalleled level of flexibility for long term deployment – all without shortening its battery lifespan. It permits on-demand data to be collected and transmitted remotely within seconds. Besides consumption data, alerts such as leak detection, no flow, reverse flow and register tampering are constantly monitored.



Downtown Sheridan, Wyoming

Through LoRaWAN, data can be transmitted swiftly to its destination – Mi.Net AMI system. This reduced delayed time attributes to identifying outage information quicker and therefore, improve quality of customer service.



Mi.Net® LW Node connected to 420RDM  
(Remote Disconnect Meter)  
to enable remote valve actuation

## MUELLER MI.NET LORAWAN (LW) NODE IN ACTION

The Town of Florence, Arizona became the first municipality to reap the benefits of the Mi.Net LW node with more than 3,000 endpoints deployed across the town. This deployment is a significant step taken for the town to fulfill comprehensive Smart City Agenda for infrastructure and connectivity advancement.

*“The deployment of smart meters is accelerating our journey toward digital transformation and the foundation required to build out our smart city grid,”* said Brent Billingsley, Town Manager of the Town of Florence. *“We are confident that this open source network solution will provide new operational efficiencies, enhanced service opportunities and additional revenue streams.”*

A big part of being a smart city is the use of streamlining processes to improve operations. For water utilities and municipalities, the ability to eliminate the need for truck rolls can dramatically reduce costs. The Mi.Net LW node has the built-in capability to seamlessly connect with Mueller Systems Model 420 RDM (Remote Disconnect Meter) that allows easy and secure remote valve actuation to turn water service on or off.

For operations to go uninterrupted, the Town of Florence can rest assured as each of the Mi.Net LW node is powered by a lithium battery that provides an abundance of power and warrants for a 20-year life inside the meter pit.

To learn more about Mueller Mi.Net LoRaWAN node, go to:  
<https://muellersystems.com/Lorawan>



Town of Florence, Arizona



Mi.Net® LW Node  
installaton in the Town  
of Florence, Arizona

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# EXHIBIT E

# 420 Remote Disconnect\*

## Bronze PD Disconnect Meter

Sizes 5/8" X 3/4" and 5/8" X 1/2"

\*Pat. www.mwppat.com

**Mueller** SYSTEMS

### Features

**APPLICATIONS:** The Hersey® RDM is a nutating disk, positive displacement meter that incorporates a radio controlled valve in a 7-1/2" laying length. The unique meter design allows utilities to retrofit 5/8" RDM meters in existing services where there is a high incidence of customer service call volume pertaining to transient or delinquent accounts, where employee safety may be a concern, or where it is difficult to gain access to meters. By accessing the account information through the Mi.Net™ AMI System User Interface screen, a radio frequency (RF) command can be initiated to turn on or off any service equipped with an RDM meter from any password protected computer authorized to access the utility site.

**CONFORMANCE TO STANDARDS:** All 5/8" X 3/4" Hersey Remote Disconnect Meters meet or exceed the latest revision of the AWWA C-700 Standard for positive displacement meters. Every 420 RDM no lead meter is compliant with the latest initiatives of NSF, ANSI and EPA standards. All electronic components utilized in the meter and RF transceiver design comply with applicable FCC, Part 15 standards and AWWA Standard C-707 for Encoded Remote Reading Systems.

**CONSTRUCTION:** Hersey 420 Residential Disconnect Meters consist of five basic parts: maincase; measuring chamber; permanently sealed register; pilot valve; and RF transceiver. The maincase is made of no lead bronze for long life. Direction of flow arrows, model, and NSF-61 designation are permanently cast into the body components. The RDM is available with a plastic bottom cover only. The measuring chambers are designed for reduced wear during operation. The top and bottom of the measuring chamber, strainer, nutating disc and thrust roller are dimensionally stable thermoplastic which will not corrode. The electronic register housing and lid, Mi.Node and pilot valve housing are all made from thermoplastic. The meter is designed so that the register and pilot valve replacement components can be serviced easily without removing the meter from the line and are protected by Hersey's unique tamper resistant locking pin and tamper resistant screw.

**REGISTER:** The permanently sealed electronic register has a unique triple "L" seal and Grilimid lens to eliminate dirt, moisture infiltration and fogging. An integral tamper-proof locking feature is provided to resist tampering with the register. The totalizing register has a straight-reading odometer type display, a 360° test circle with center sweep hand and a low flow (leak) detector. Standard gearing is used, making registers interchangeable by size. The RDM is available with an integral or a remote mounted RF transceiver for optimal performance.

**OPERATION:** Water flows through dual strainers in the pilot valve assembly. Differential pressure provides the operating principal for the valve activation. Water flows through the meter's strainer where debris is screened out. The incoming water fills a known volume of the measuring chamber on one or the other side of a movable disc that separates the chamber into two sections. As water enters, it moves the disc (nutates), forcing a known volume of water out of the meter from the opposite side of the disc. The process repeats as the sections refill and empty in turn. The nutating action of the disc is coupled magnetically to the register to indicate the volume of water that passes through the meter.

The pilot valve can be actuated via the User Interface from any web enabled device with the proper log in and password. System screens indicate the position of the valve (open or closed) and record the date and time for all valve activations providing a permanent record of each account's history.



5/8" x 3/4" Remote Disconnect Meter

**MAINTENANCE:** The Hersey RDM meter is designed and manufactured to provide long service life with virtually no maintenance required. Repair components available include complete chamber assemblies and pilot valve repair kits when required. All components can be accessed without removing the meter from the service line for simplified maintenance.

**CONNECTIONS:** Supplied with external straight pipe threads (NPSM) per ANSI B1.20.1

### Materials and Specifications

MODEL	(RDM) or Remote Disconnect Meter
SIZES	5/8" X 1/2", 5/8" X 3/4"
STANDARDS	AWWA C-700, Current NSF-61, ANSI, & EPA Initiatives
SERVICE	Measurement of flow in forward direction only
INSTALLATION	Horizontal
OPERATING FLOW RANGE	See Charts on the following pages
ACCURACY	See Charts on the following pages
MAXIMUM WORKING PRESSURE	150 PSI
TEMPERATURE RANGE	33° F to 100° F water temperature
MEASURING ELEMENT	Nutating Disc PD Chamber
WIRE LENGTH OPTIONS	INTEGRAL, 3', 15'
REGISTER TYPE	Straight reading, permanently sealed, magnetic drive with low flow indicator and remote reading capability
BATTERY LIFE	20 Years
METER CONNECTIONS	External straight pipe threads (NPSM)
MATERIALS	Meter case – Bronze Disconnect Valve – Pilot Type Bolts – Stainless Steel Measuring Element Chamber and Disc – Thermoplastic Disc Pin – SST Strainer – Thermoplastic

**Mueller** SYSTEMS**420 Remote Disconnect\***

Bronze PD Disconnect Meter  
 Sizes 5/8" X 3/4" and 5/8" X 1/2

\*Pat. www.mwppat.com

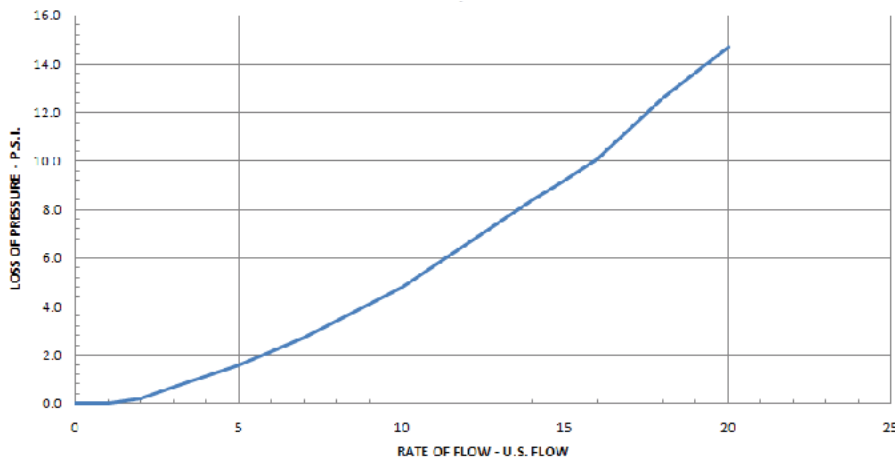
**Meter Registration**

Meter Size	Initial Dial*	Capacity	Initial Dial*	Capacity
5/8"	10 Gallons	10 Million	1 Cubic Ft.	1 Million

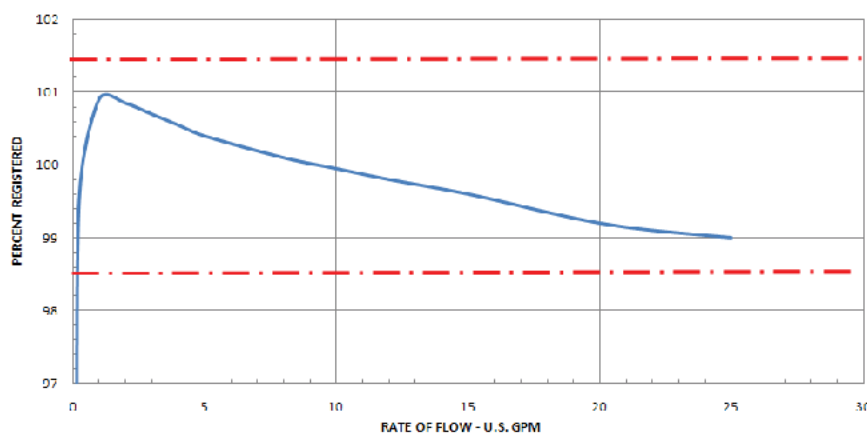
\*Registration equal to one full revolution of the sweep hand.

**Flow Characteristics**

Meter Size	Typical Low Flow (95% Minimum)	Typical Operating Range (100% $\pm$ 1.5%)	Maximum Continuous Operation
5/8"	1/8 GPM	1/2 to 20 GPM	15 GPM

**Performance****Head loss**

NOTE: Performance curves are typical only and NOT a guarantee of performance.

**Accuracy**

NOTE: Performance curves are typical only and NOT a guarantee of performance.



# 420 Remote Disconnect

**Mueller** SYSTEMS

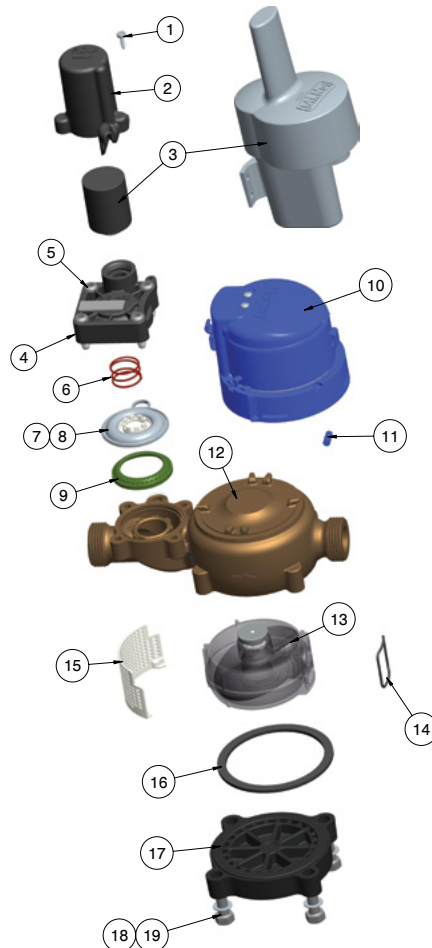
Bronze PD Disconnect Meter

Sizes 5/8" X 3/4" and 5/8" X 1/2

\*Pat. www.mwppat.com

## MODEL 420 RDM BRONZE METER ASSEMBLY COMPONENTS

ITEM	PART #	DESCRIPTION	QTY
1	BKPLTSCREW	#6 X 1/2" SELF TAPPING TRI-WING HEAD SS	1
2	C6680	SOLENOID TAMPER COVER	1
3	MSW-RDM-XX	Mi.NODE RADIO WITH SOLENOID	1
4	C6679A	MODEL 420 RDM VALVE COVER WITH ORIFICE	1
5	98411	1/4-20 X 1" BHCS SS	4
6	A13099	MODEL 420 RDM VALVE SPRING SS	1
7	B8676	MODEL 420 RDM DIAPHRAGM ASSEMBLY	1
8	B8676KIT	DIAPHRAGM REPLACEMENT KIT (PARTS 6,7, & 9)	-
9	B8684	MODEL 420 RDM SUPPORT RING	1
10	D36991XX	MODEL 420 TRANSLATOR REGISTER SG	1
	D36992XX	MODEL 420 TRANSLATOR REGISTER CF	
	D36993XX	MODEL 420 TRANSLATOR REGISTER CM	
11	A12658	REGISTER LOCKING PIN	1
12	D3688SI	5/8" X 3/4" MODEL 420 RDM MAIN CASE	1
	D2688-1SI	5/8" X 1/2" MODEL 420 RDM MAIN CASE	
13	D3635PO	MODEL 420 CHAMBER ASSEMBLY	1
14	A13120	MODEL 420 CHAMBER O-RING	1
15	C6681	MODEL 420 BRONZE STRAINER RETAINER	1
16	B8664	MODEL 420 BRONZE GASKET	1
17	C6682	MODEL 420 PLASTIC BOTTOM PLATE	1
18	90010	5/16-18 x 1-1/8" HEX BOLT SS	4
19	90018	5/16 FLAT WASHER SS	4



**Mueller** SYSTEMS

# 420 Remote Disconnect \*

Bronze PD Disconnect Meter  
 Sizes 5/8" X 3/4" and 5/8" X 1/2"

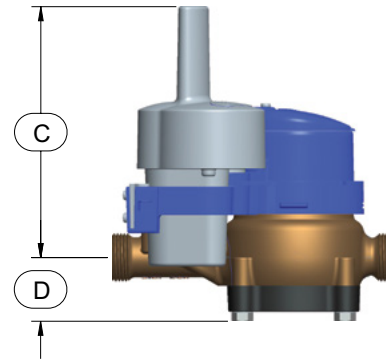
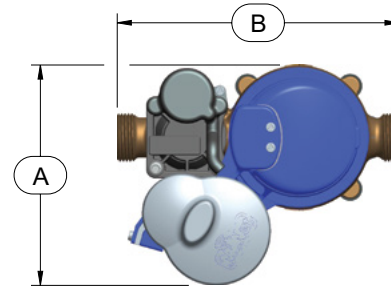
\*Pat. www.mwppat.com

## Dimensions, Weights and Parts

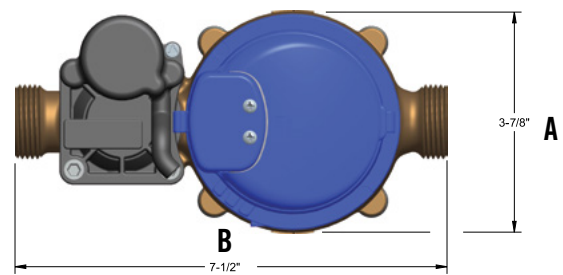
Meter Size	5/8"	
Model	RDM INTEGRAL	RDM REMOTE
Dimension		
A	5.875"	3.875"
B	7.5"	7.5"
C	6.6875"	4.1875"
D	1.6875"	1.6875"
Weight	5.0	5.0

Weights are in pounds and are approximate.  
 Inlet and outlet 1/2" or 3/4"

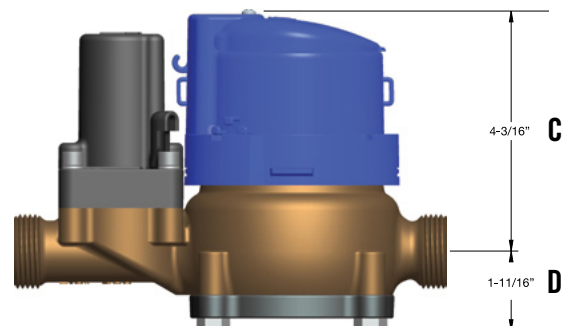
### 420 RDM with Integral Mi.Node



### 420 RDM with Remote Mi.Node



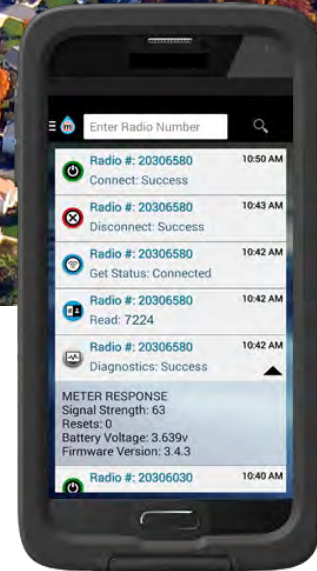
APPROXIMATE WEIGHT: 5 LBS.



# EXHIBIT F



Improving customer service, increasing operational efficiency and maintaining employee safety just got easier.



**mobileRDM™** is Mueller Systems' simple handheld application that enables water utilities to remotely connect or disconnect water services from the safety of their vehicles using 2-way radio communication.

- Field-friendly Android handheld device is waterproof, dust-proof, snow-proof, drop-proof and has a long-lasting battery life.
- Does not require using advanced metering infrastructure (AMI) or automated meter reading (AMR) but can be used on any existing system.

To learn more about how the **mobileRDM** application can help improve your operations, please call 800-323-8584 or visit us at [muellersystems.com](http://muellersystems.com).



### Benefits:

- Improved employee safety
- Enhanced customer service
- Increased operational efficiency
- Ability to connect/disconnect water service from vehicle without using AMR/AMI
- Can be used in any AMR/AMI existing system.

### 420 Remote Disconnect Meter

Mueller Systems' 420 RDM is fully-integral with 5/8" positive displacement (PD) meters and can quickly and easily be installed without requiring any replumbing.

# mobileRDM™

Using the **mobileRDM** application, workers can push a button to receive status information, read the meter, connect or disconnect service and run diagnostics.

## How It Works:



While parked within 1,000 feet of a service connection that is fitted with a 420 RDM, utility workers simply select a function on the **mobileRDM** application.

The **mobileRDM** application communicates with the Mueller Systems Maintenance Radio.

During a 25-30 second process, the **mobileRDM** application confirms to the user that the signal has been sent.



Once connected with the **mobileRDM** application, water service can be connected or disconnected. The **mobileRDM** application confirms to the user when the process is complete.

Radio #: 20306580 10:42 AM  
Diagnostics: Success

METER RESPONSE  
Signal Strength: 63  
Resets: 0  
Battery Voltage: 3.639v  
Firmware Version: 3.4.3

To learn more about how the **mobileRDM** application can help improve your operations, please call 800-323-8584 or visit us at [muellersystems.com](http://muellersystems.com).



# EXHIBIT G

**MUELLER**

## NETWORK OPERATIONS CENTER

### PROVIDING THE ASSURANCE OF ROUND-THE-CLOCK SYSTEM SURVEILLANCE

**Mueller Systems® Network Operations Center (NOC) is a round-the-clock sentry, providing real-time surveillance of its North American customers' water infrastructure.**

Located in Atlanta, Georgia, the NOC is staffed by highly skilled analysts, each of whom is assigned a specific group of customers. Using web-based tools developed by Mueller, analysts access customers' networks and monitor all data sources — including collectors, repeaters and nodes. If an anomaly is detected anywhere, at any time, the customer can be contacted for immediate trouble shooting — before the issue becomes a problem.

All Mueller Systems contracts include service level agreements, with NOC data monitoring and reporting provided at predetermined levels, based on customer needs. Mueller Systems customers value the expertise, timeliness and precision of NOC services — and the peace of mind that comes from continuous, real-time surveillance.

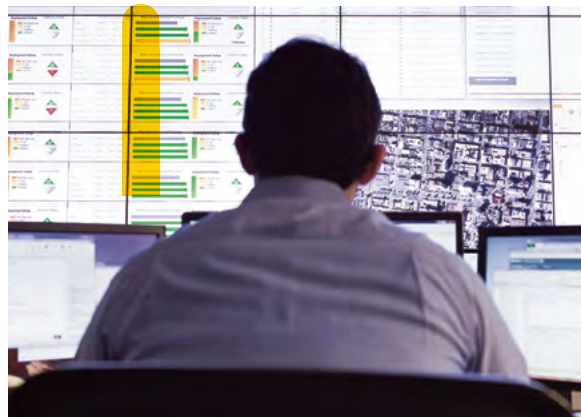
Four tiers of industry-leading support are available, including:

- Phone Support
- Live Monitoring
- Quality Assurance
- Engineering Support

Mueller also licenses its proprietary technology for customers that wish to self monitor.

Giving residents access to safe, clean drinking water is among the most capital-intensive and operationally-significant services provided by water utilities. From water consumption to billing integrity, ensuring the safety, reliability and cost-effectiveness of water infrastructure requires constant vigilance.

**Learn how Mueller Systems NOC can help safeguard your water infrastructure by calling us today at 1.800.423.1323 or by visiting us online at [www.muellersystems.com](http://www.muellersystems.com).**



By freeing up resources otherwise required to monitor infrastructure data, customers are able to focus on higher-value activities that improve the efficiency and return-on-investment of their water infrastructure.

Mueller is committed to creating value through an unbeatable combination of industry-leading technology; innovative and reliable water infrastructure products; and laser-focused customer service. All of this comes together at the NOC.

### HOW OUR NETWORK OPERATIONS CENTER BENEFITS YOUR UTILITY

Always-on, real-time surveillance of water infrastructure

NOC system monitoring allows your team to focus on higher-value activities

NOC surveillance services are offered at a range of levels, based on your utility's needs

By bringing together Mueller Systems unrivaled technology, products and service, the NOC unlocks value throughout your water systems

**For more information about Mueller or to view our full line of water products, please visit [muellersystems.com](http://muellersystems.com) or call Mueller customer service at 1.800.423.1323.**

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**MUELLER**

# EXHIBIT H



## 420 Remote Disconnect Meter (RDM)

The Mueller Systems' 420 RDM (remote disconnect meter) provides utilities with the opportunity to utilize existing meter boxes and piping configurations to install the only positive displacement meter on the market with an integrated shut off valve in a 7.5" laying length. Implementing this solution within the distribution system permits utilities to address move ins/move outs, delinquent accounts, and minimize interior damage in the event of broken pipes when residents aren't home. The meter and system reduces the need for truck rolls and minimizes the utility's carbon footprint...and now we provide multiple options for RDM activation with the Mi.Net system in either mobile or fixed network mode. See why our true two way system options provide more value than other systems on the market.



+ Applications

+ Conformance To Standards

+ Construction

+ Register

+ Operation

+ Maintenance

## × Construction

Mueller 420 Residential Disconnect Meters consist of five basic parts: maincase; measuring chamber; permanently sealed register; pilot valve; and RF transceiver. The maincase is made of no lead bronze for long life. Direction of flow arrows, model, and NSF-61 designation are permanently cast into the body components. The RDM is available with a plastic bottom cover only. The measuring chambers are designed for reduced wear during operation. The top and bottom of the measuring chamber, strainer, nutating disc and thrust roller are dimensionally stable thermoplastic which will not corrode. The electronic register housing and lid, Mi.Node and pilot valve housing are all made from thermoplastic. The meter is designed so that the register and pilot valve replacement components can be serviced easily without removing the meter from the line and are protected by Mueller's unique tamper resistant locking pin and tamper resistant screw.

## + Register

## + Construction

### ✕ Register

The permanently sealed electronic register has a unique triple “L” seal and Grilimid lens to eliminate dirt, moisture infiltration and fogging. An integral tamper-proof locking feature is provided to resist tampering with the register. The totalizing register has a straight-reading odometer type display, a 360° test circle with center sweep hand and a low flow (leak) detector. Standard gearing is used, making registers interchangeable by size. The RDM is available with an integral or a remote mounted RF transceiver for optimal performance.

## + Operation

## + Maintenance

## × Operation

Water flows through dual strainers in the pilot valve assembly. Differential pressure provides the operating principal for the valve activation. Water flows through the meter's strainer where debris is screened out. The incoming water fills a known volume of the measuring chamber on one or the other side of a movable disc that separates the chamber into two sections. As water enters, it moves the disc (nutates),

forcing a known volume of water out of the meter from the opposite side of the disc.

The process repeats as the sections refill and empty in turn. The nutating action of the disc is coupled magnetically to the register to indicate the volume of water that passes through the meter.

The pilot valve can be actuated via the User Interface from any web enabled device with the proper log in and password. System screens indicate the position of the valve (open or closed) and record the date and time for all valve activations providing a permanent record of each account's history.

## + Maintenance

# EXHIBIT I



network mode. See why our true two way system options provide more value than other systems on the market.



# EXHIBIT J



Enhancing Customer Service and  
Utility Efficiency with Smart Water Networks





# The solution to manage your entire smart water program.



Intelligence meets infrastructure with the Mi.Net® system, the comprehensive data gathering solution for water utilities from Mueller Systems. An open standards-based system, the Mi.Net system manages your entire smart water program with an innovative and advanced network solution that enables you to implement existing and future smart technologies.



# Smart capabilities that evolve with your needs.

- **True two-way, command and control functionality**
- **Industry-leading, long-range capability featuring licensed and unlicensed frequencies**
- **Easily migrate from a drive-by to fixed AMI system**
- **Designed to meet the needs of any size utility, geography, and budget**
- **Network, meters, sensors, control devices and leak detection all provided by Mueller**

The Mi.Net system links service connections, distribution sensors, and control devices in a technology ecosystem for real-time access and control. This smart solution provides the ultimate in cost-effective scalability that enables your utility to add advanced capabilities to your network as your smart city program evolves — and new technologies that generate additional revenue streams as they become available.

The Mi.Net system is designed to LoRa open architecture standards that enables data to travel faster and further, while communicating with more devices.





# Manage water connections remotely.



# Reduce OPEX costs and control usage at each customer site with a proven remote-disconnect meter.

Whether you have a fixed network or a migratable drive-by solution, Mueller Systems' 420 RDM (remote disconnect meter) enables your crews to connect and disconnect water services from the safety and security of your office or vehicles. Especially helpful if you have high account turnover, the 420 RDM protects employees, lowers labor and operational costs, reduces your carbon footprint, and shortens wait-times for better customer service. With more than five years of operational experience on the Mi.Net network, the 420 RDM is a tested and proven smart-city solution.



- Improve customer service
- Reduce truck rolls
- Increase employee safety
- Improve cash flow



# Fixed leak detection for distribution mains.



# Automatically detect leaks to prioritize repairs and reduce OPEX spending.

The *EchoShore®-DX* leak detection platform incorporates the latest generation of acoustic sensors to transform your existing field assets into a smart water network. A proven leak detection technology, the *EchoShore-DX* platform has been successfully deployed on virtually every type of pipe material, and operates seamlessly over a Mi.Net or cellular network. The acoustic technology is built into a standard fire hydrant pumper nozzle cap, maintaining a stealth appearance. *EchoShore-DX* technology enables you to find leaks sooner, monitor leak progression, assign field crews based on actual leak criticality, and become proactive with your pipe repair program.

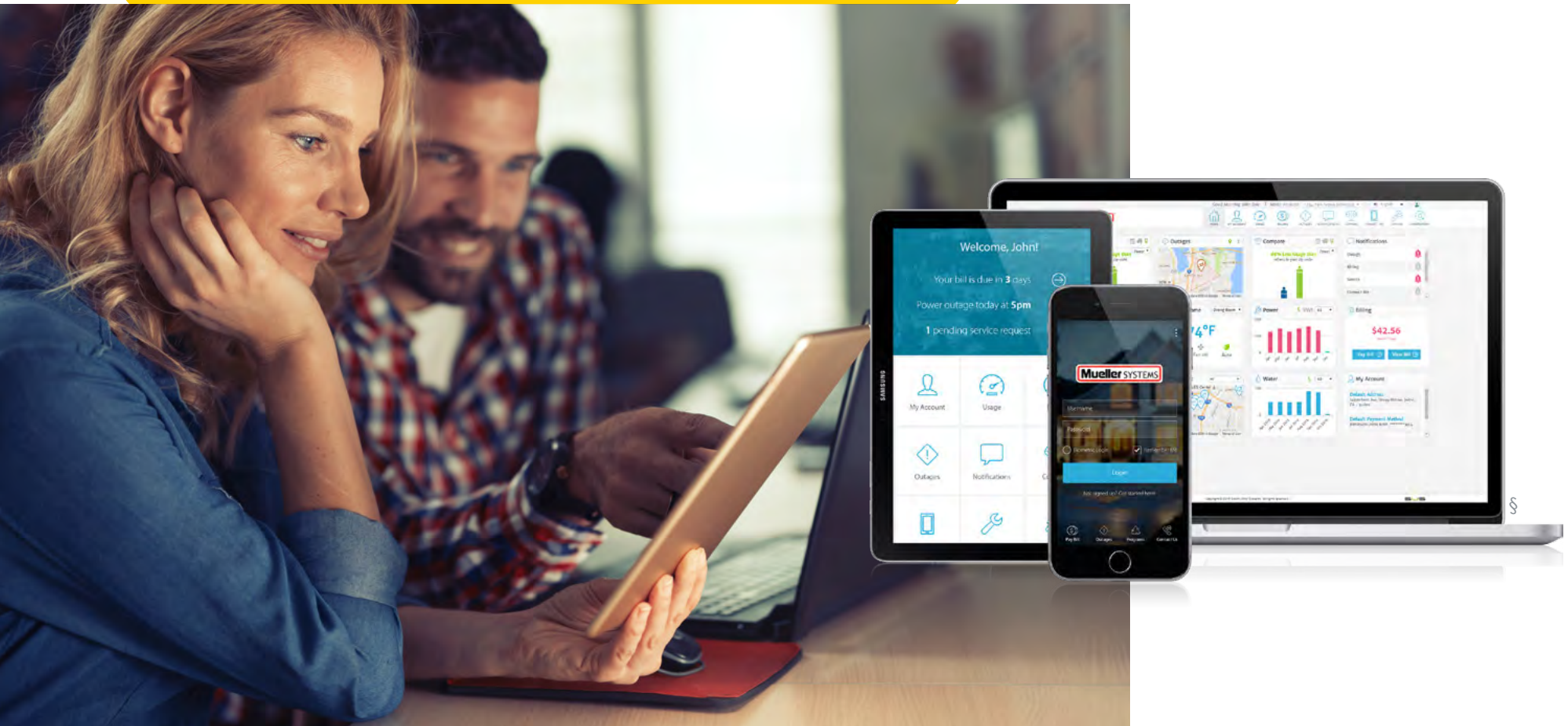


- Water loss reduction
- Leak management
- Aging pipe infrastructure management
- Customer service improvement





Deliver enhanced services through a customer portal.



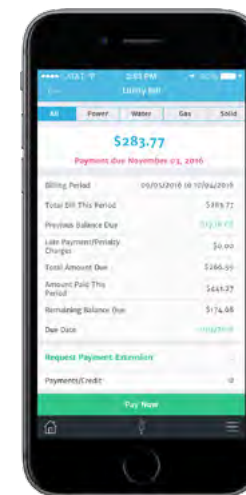
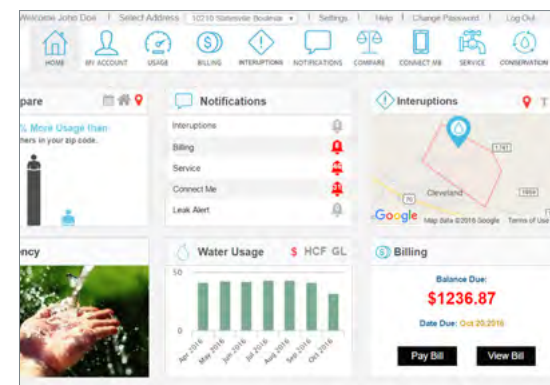


# Strengthen the relationship between your utility and your customer — the smart way.

The Mi.Net data portal improves your service and conservation efforts by providing customers an online view of their water usage using a personal computer or mobile app. The interactive portal graphically presents real-time and historical usage data collected by the Mi.Net system, enabling customers to:

- Simplify billing processes
- Enable customer pre-payment
- Monitor water usage
- Compare current usage to previous periods
- Configure individual alerts
- Set budget and water conservation goals
- Estimate usage costs before receiving a monthly bill
- Identify inconsistencies that may indicate the presence of leaks

Customize your portal with images and logos to reinforce your brand and location. Promote conservation efforts by posting articles and videos that educate customers how to change consumption habits to meet usage or budget goals.

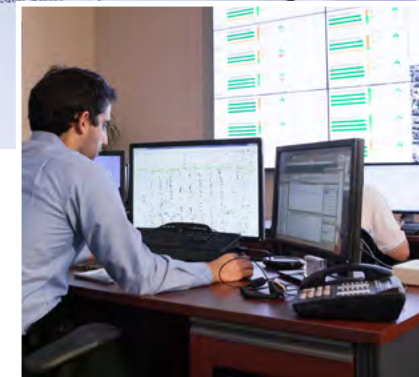




## Network Operations Center.

Maximize your smart city investment.

The Mueller Systems Network Operations Center (NOC) based in the United States monitors water infrastructure for utilities across North America. The NOC is staffed by highly skilled analysts, each responsible for a specific group of Mi.Net customers. Proactively monitoring real-time network performance on the NOC's nine-foot-high command screen, our analysts immediately alert you if they detect an anomaly — enabling quick resolutions to problems, and a highly optimized network. Freeing your utility staff from monitoring network data enables focusing on your core utility activities, improving your infrastructure efficiency, and boosting your return on investment.



**Mueller Systems enables you to tackle tough water utility challenges with the confidence of knowing that a stable, long-term partner is supporting your smart city efforts — every step of the way.**





# LoRa Alliance.

## Moving smart cities forward.

Leveraging Internet of Things (IoT) technologies, municipalities are transforming their water networks into open standards-based systems, improving service offered to customers, and enhancing the connectivity of a wide range of city services.

As a member of the LoRa Alliance, Mueller Systems is bringing IoT technology to water infrastructure through the Mi.Net® system. Other members of the alliance include multi-national telecommunication companies, equipment manufacturers, system integrators, sensor manufacturers, and entrepreneurial start-ups.



The Mi.Net system employs LoRa technology. LoRa, short for “low power, long range,” is an RF modulation technique that offers high-power transmissions and increased range over traditional systems with lower battery usage.

# Your partner for smart city solutions.

Mueller Systems is part of Muller Water Products, Inc., a supplier of leading solutions for smart city infrastructure that is exclusively focused on the needs of water utilities, offering AMI, leak detection, remote shutoff, automated flushing, pressure management, pipe condition assessment, and more. Mueller Systems is driving the development of technologies that incorporate sensor-based data gathering and next-generation networking capabilities. Mueller Systems enables you to tackle tough water utility challenges with the confidence of knowing that a stable, long-term partner is supporting your smart city efforts — every step of the way.

Find out how Mueller Systems can help you by calling 800-323-8584 or visiting [www.muellersystems.com](http://www.muellersystems.com).



# EXHIBIT K



# MUELLER

## MI.NET® MUELLER INFRASTRUCTURE NETWORK

### Mi.Net Repeaters

#### FEATURES

**Overview:** Repeater components of the Mi.Net® Mueller Infrastructure Network for Utilities provide a bridge between Mi.Node devices and the Mi.Hub collector, increasing the maximum distance between the meter and the collector. Multiple repeaters can be installed to further extend the range. Implementing these repeaters reduces the network cost and complexity.

**Real Time Data:** The repeaters periodically collect data retrieved from each Mi.Node within its range before forwarding the data to an upstream Mi.Hub data collector or to other repeaters. The repeaters can also be instructed to retrieve “On Demand” meter readings in real-time from one or all meters in their range when a user requests them, offering true two-way communication between the user and all meters in the network.

**Secure and Robust:** The innovative repeater design provides robust multi-path RF coverage and is capable of storing Mi.Node data for surrounding meters in internal memory and transmitting it to other devices within the Mi.Net System, such as the Mi.Hub and other nearby repeaters or nodes. All communications are protected with advanced encryption algorithms to ensure data privacy and prevent intrusion.

#### BENEFITS

- Enhances access to information about water and electric utilization and increases operational efficiency
- Reduces operating cost and dramatically decreases installation and maintenance expense by reducing backhaul requirements
- Facilitates instant remote access to usage and demand data
- Large data capacity provides weeks of data storage across thousands of meters
- Seamless interoperability with all existing Mi.Net devices

- Backup battery keeps system fully operational even during power outages
- Optional solar photovoltaic module eliminates need for external power

#### REPEATER PRODUCTS PROVIDE A VERSATILE AND ROBUST NETWORK ACROSS ALL AREAS OF THE COMMUNITY.



**MI.NODE OWL:** The Owl infrastructure repeater conveniently installs in existing street lights, minimizing installation complexity and cost. The Owl repeater takes advantage of the daylight sensor's available power source and utilizes this existing socket without hindering the sensor's operation. The Owl requires no dedicated wiring for installation and is unobtrusive in appearance, completely blending into the existing neighborhood landscape. The Owl repeater is built in a weatherproof enclosure for robust, all-season operation.



**MI.NODE AC REPEATER:** This AC-powered repeater installs onto virtually any solid surface, such as a pole, wall or tower. It is powered by an external AC power source. It also contains an internal backup battery pack for operation during short power outages. The repeaters are housed in weather proof enclosures for robust, all-season operation.



**MI.NODE DC REPEATER:** This DC-powered repeater installs onto virtually any solid surface, such as a pole, wall or tower. It is equipped with a high-capacity battery pack, providing an exceptionally long lifetime between battery replacements. It incorporates multiple vapor barriers such as a weather proof enclosure, coated electronic board and potting compound, all of which eliminate moisture intrusion in even the harshest environments.



**MI.HYDRANT XR:** The Mi.Hydrant XR consists of an enclosed, weatherproof transceiver that is unobtrusively fixed under the rim of the most common fire hydrants. The repeater does not hinder the hydrant's operation and comes equipped with an extended range high-gain antenna, which provides a dual function as a hydrant marker during extreme snow and weather related events. Mi.Hydrant XR is equipped with a high-capacity battery pack providing an exceptionally long lifetime. The Mi.Hydrant XR unit incorporates multiple vapor barriers such as a weather proof enclosure, coated electronic board and potting compound, all of which eliminate moisture intrusion in even the harshest environments.

## SPECIFICATIONS (SUBJECT TO CHANGE)

	MI.NODE OWL	MI.NODE AC POLE MOUNT	MI.NODE DC POLE MOUNT	MI.HYDRANT XR
<b>POWER</b>				
<b>Power Dissipation</b>	>1 W typical, 5 W max	>1 W typical, 5 W max	<0.01 W typical when idle; <3 W typical when transmitting	<0.01 W typical when idle; <3 W typical when transmitting
<b>Power Source</b>	AC Line Voltage; 110-277 VAC; 60 / 50 Hz	AC Line Voltage; 110-277 VAC; 60 / 50 Hz; Internal battery backup for up to 8 hours operation during outage	Sealed Lithium battery pack.	Sealed Lithium battery pack.
<b>PHYSICAL</b>				
<b>Dimensions</b>	6" x 5.5" x 4.5" (15.2 cm x 14.0 cm x 11.4 cm) Light Sensor: 2" x 5.5" x 4.5" (6.8 cm x 14.0 cm x 11.4 cm)	5.0" x 5.0" (12.7 cm x 12.7 cm) x 3.0" (7.6 cm) Power cable : 3 conductor 16 AWG RF cable: LMR240 with type N male connectors	10.5" x 5.0" x 3.5" (26.7 cm x 12.7 cm x 8.9 cm) Antenna : 54.0" tall (137.2 cm) x 0.75" diameter (1.9 cm)	10.5" x 5.0" x 3.5" (26.7 cm x 12.7 cm x 8.9 cm) Antenna : 54.0" tall (137.2 cm) x 0.75" diameter (1.9 cm) with a 4.0" diameter spring base (10.2 cm)
<b>Color</b>	Grey polymer	White polymer	Grey powder coating	Grey powder coating
<b>Weight</b>	1.2 lbs (0.5 kg) Light sensor: 0.2 lbs (0.1 kg)	1.0 lb (0.5 kg) (without antenna & bracket) 5.5 lbs (2.5 kg) (with antenna & bracket)	5.0 lbs (2.3 kg) (without antenna & bracket) 9.5 lbs (4.3 kg) (with antenna & bracket)	5.0 lbs (2.3 kg) (without antenna & bracket) 9.5 lbs (4.3 kg) (with antenna & bracket)
<b>I/O</b>	None	Green AC; Power Led	None	None
<b>RF RADIO</b>				
<b>Frequency</b>	915 MHz ISM Band Operation Frequency Hopping/ Spread Spectrum Operation			
<b>Output Power</b>	1W Transmit			
<b>Antenna</b>	External 2.5 dBi Antenna, included	External 3.0 dBi Antenna, included	External 2.5 dBi Antenna, included	External 4.0 dBi Antenna, included
<b>ENVIRONMENTAL</b>	-30 to +70°C Operating; -40 to +85°C Storage; 5 to 95% Relative Humidity NEMA-4 Weather Proof Enclosure			
<b>DATA</b>	<ul style="list-style-type: none"> <li>Collect and store data from up to 2000 meters, 2MB Solid-state Flash Memory for dedicated storage of readings</li> <li>Protocol with up to 5 Redundant Links</li> <li>Infrastructure or ad hoc networking</li> <li>Remote configuration capability</li> <li>Packet data up to 28.8 kbps, End-to-end 128bit RC4 encryption</li> <li>ICMP and SNMP for remote diagnostics and monitoring</li> </ul>			
<b>CERTIFICATIONS</b>	<ul style="list-style-type: none"> <li>CC 47 Part 15, Unintentional Radiators</li> <li>ANSCI C136.10-2010</li> <li>FCC 47 CFR Part 15.247</li> <li>UL/TUV 61010, CSA-C22.2 Compliant</li> <li>IC RSS-210</li> </ul>			

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# EXHIBIT L

**MUELLER**



# **Cellular Node**

Network-as-a-Service Water Endpoint



At Mueller, we are accelerating our investments in smart water technologies that will provide business insights to water utilities, enabling them to improve operational efficiency, reduce water loss and increase their customer satisfaction levels.

Mueller Cellular node is the latest addition to Mi.Net Advanced Meter Infrastructure (AMI) system – a communications network that automates the meter-reading-to-billing process, linking meters, distributions site and control devices in a single, efficient data network.

## What is Mueller Cellular Node?

The Mueller Cellular Node allows water utilities to connect meters to their AMI network where radio communication is not feasible or cost effective. This Network-as-a-Service (NaaS) endpoint solution communicates with encoded water meters, including meters that are already in operation. The agility that comes with this model allows utilities to deploy an AMI network in small areas, or entire distribution network, without the need for traditional infrastructure and maintenance.



Like other Mueller nodes, the Cellular Node feeds consumption data directly to the Sentryx Water Intelligence Platform which provides utilities with a holistic view and insights into the health of their distribution systems including pressure, consumption and leak detection.

## Why Mueller Cellular Node?



**Provisioning speed:** Nodes can be up and running in a matter of days.



**Reduced costs:** Implementing NaaS not only significantly reduces costs including infrastructure, operations and maintenance, but also minimizes risks associated with implementing new processes, hardware and software.



**Enhanced Security:** Mueller has implemented security measures to provide data protection on the user interface, critical field devices, and utility IT data systems. Amazon Web Service (AWS) provides an added level of protection of the utility, homeowner and business data.



**Operational efficiency:** When paired with the Mueller remote disconnect/reconnect meter, utilities no longer need to send utility personnel to the site to perform meter reading or turning it on or off.



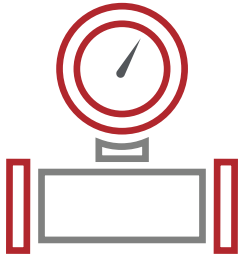
**Remote and rural community accessibility:** Utilities can look to this solution to “fill the holes” in the network without having to replace encoded meters or add expensive network infrastructure..



**Supports network sustainability:** Through the Sentryx platform, utilities can see their water network data meaningfully displayed on one secure platform with intuitive dashboards to navigate with ease and minimal training.

## Mueller Cellular Node Use Cases

### Water Utility Business Challenges



Increase water meter infrastructure efficiency and effectiveness

### How the Cellular Node can help

Connecting the Cellular Node to a positive displacement, solid state meter, electromagnetic flow meter, or other encoded meter, allows usage and flow data to be monitored 24/7 and obtained quickly without the operational burden of setting up and maintaining the system infrastructure. Data parsed through the Sentryx algorithm are converted into valuable insights for utilities to take preventive actions on their systems.

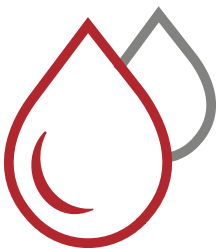
When supply network evolves, water utilities can add more data points without reconfiguring the entire platform architecture.



Financing for capital improvements

For utilities serving connections across varied population density, AMR and fixed-base AMI are a natural fit for urban areas, but less-so in rural, hard-to-reach areas where utility personnel safety is in question and there are not enough connections to justify the cost of setup and maintenance.

The deployment of the Cellular Node allows the system to be connected without the need to remove existing encoded meters. By utilizing existing cellular networks, delay in meter reading and risk of lost or unbilled revenue minimized.



Long term water supply availability

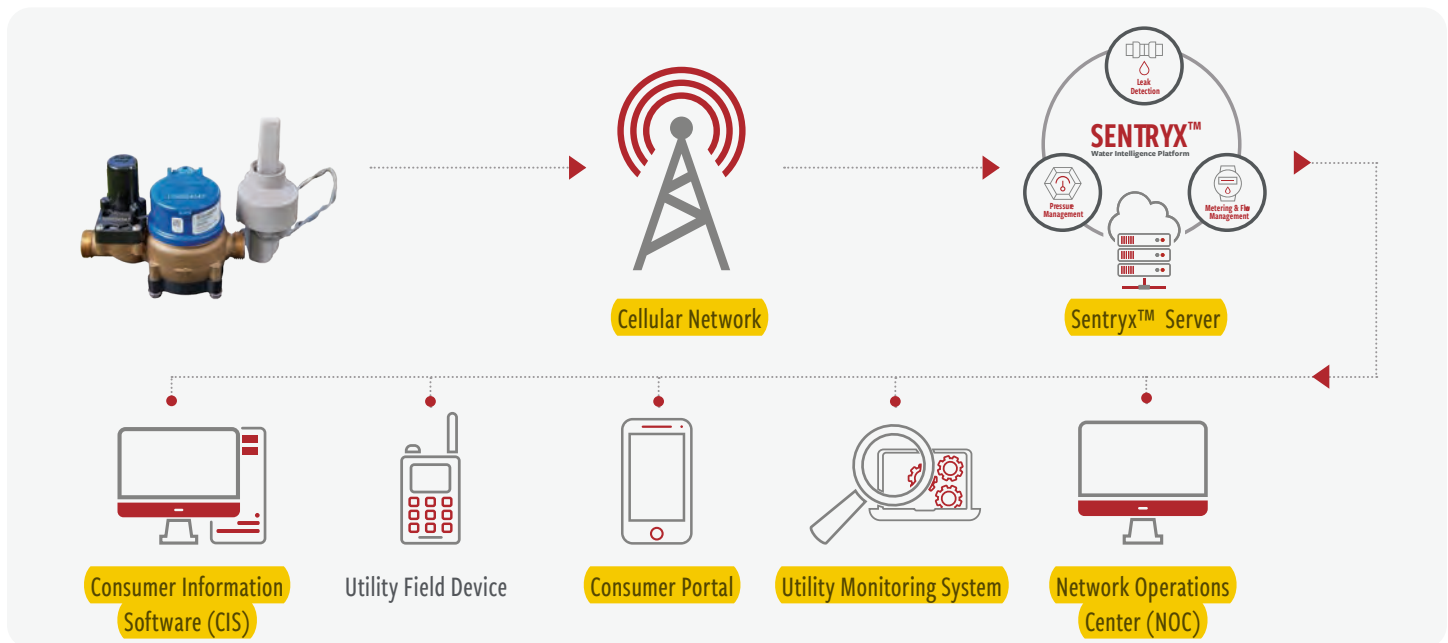
Metering encourages water conservation with consumption data flow critical for raising awareness of water usage and empower residents and businesses to develop their own strategies to reduce usage and energy.

## Achieving Sustainable Urbanization with the Sentryx™ Platform.

As the world continues to rapidly densify, developing a sustainable smart city is critical to the effective management of the city's assets and resources in a way to continuously improve the quality of life of the citizens from an economic, social and environmental level.

For smart cities to thrive with an ever-growing demand for water – our priceless resource, focusing on the key building block of a smart city i.e. smart water, is a great place to start.

The Sentryx platform provides smart utilities an intuitive way of visualizing patterns and anomalies by integrating multiple data sources on one single platform. Utilities can deploy and dispatch employees by technologies to drive maximum efficiency.



The solution connects meters, distribution sensors and control devices in an efficient wireless network for near real-time access.

Together with Mueller Cellular node, this smart and scalable solution provides the ultimate in flexibility and security, allowing the utility to cost-effectively add advanced capabilities to fixed networks or drive-by solutions, without replacing the entire system.



Discover what Mueller Cellular Node can do for your utility.  
Talk to us at **1.800.423.1323**  
or visit <https://marketing.muellerwp.com/mscellnode>

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**MUELLER**

# EXHIBIT M



# MUELLER

## SOLID STATE METER (SSM)

Sizes  $\frac{5}{8}$ " x  $\frac{3}{4}$ " and  $\frac{3}{4}$ " Short;  $\frac{3}{4}$ " Long; and 1"

**Applications:** The Mueller solid state meter (SSM) is available in  $\frac{5}{8}$ " x  $\frac{3}{4}$ " through 2" sizes. The SSM meter provides 8 digits of granular data for visual reads and 8 digits in encoded electronic format for use in Mueller Mi.Net AMR / AMI applications. The meter can be used in any residential or commercial application where a high degree of accuracy at low flow rates is important.

**Construction:** The SSM meter utilizes a low lead copper alloy body with a polymer measuring tube and patented stainless steel reflectors. A heat treated glass lens and polymer lid surround provide protection for the liquid crystal display. 3.6 volt lithium batteries provide power for the processor for 20 years of life. All internal electronics are potted to prevent water intrusion in the toughest environments.

**Operation:** The SSM meter utilizes ultrasonic measurement technology to provide outstanding accuracy across a broad flow range with extremely low pressure loss. The static meter design means there are no moving parts inside the meter so it will not degrade in accuracy over the life of the meter due to mechanical wear, providing exceptional revenue for years to come.

With starting flow rates as low as 0.017 GPM and ultra-low flow accuracy of 95% at 0.05 GPM on the  $\frac{5}{8}$ " x  $\frac{3}{4}$ " and  $\frac{3}{4}$ " short sizes, the SSM is capable of wringing every drop of revenue from your system and detecting the smallest leaks and backflow conditions. The stainless steel reflectors and measuring tube design channel water over the reflectors to keep them free of debris and increase the velocity of the water as it passes through the tube, contributing to the high degree of meter accuracy.

The display provides large numerals and icons that permit verification of the 8-digit meter volume as well as direction of flow, error alarm status, and battery life. A unique, never duplicated 8-digit serial number on the SSM meter faceplate and lid identifies it as the basis for all systems communication.

The register face plate and housing provide visual information specific to the registration units, model, size, date of manufacture, and billing units, to provide verifiable and retrievable data in the event it is required.

**Conformance to standards:** Mueller SSM meter complies with AWWA C-715 requirements for accuracy and odometer wheel height as well as the American Standard Code for

Information Interchange or ASCII.

**Operation:** When interrogated by a Mueller AMR / AMI device, the SSM meter communicates the unique 8-digit serial number and 8-digit electronic reading in ACSII format where it can be recorded and maintained within the reporting structure of the AMR / AMI system. In the event that

field testing is required, an optical button located on the display faceplate can be utilized to place the meter in test mode which provides excellent resolution for testing purposes.

**Maintenance:** The Mueller SSM meter is designed and manufactured to provide a 20 year service life with virtually no maintenance required. Meter lids are available as replacement components in the event of vandalism or the need for meter retrofits.

SOLID STATE METER

$\frac{5}{8}$ " x  $\frac{3}{4}$ " - 1"



## MATERIALS AND SPECIFICATIONS

<b>Model</b>	Solid State Meter (SSM)
<b>Register Type</b>	Solid State Encoder Register
<b>Sizes</b>	$\frac{5}{8}$ " through 2" Ultrasonic Meters
<b>Standards</b>	Manufactured and tested to meet or exceed all applicable accuracy and pressure loss requirements of the AWWA C-715 standard and the American Standard Code for Information Interchange (ASCII)
<b>Temperature Operating Range</b>	34°F to 158°F
<b>Storage Temperature Range</b>	-4°F to 158°F
<b>Water Temperature Range</b>	34°F to 140°F
<b>Connection Options</b>	18" Nicor Connector, 5' flying lead wire, with factory potted connections
<b>Materials</b>	Processor / register housing and lid - thermoplastic; Register lens - heat treated, tempered glass; LCD, polymer measuring tube, SST reflectors
<b>AMR / AMI Compatibility</b>	Mi.Net AMR / AMI system, and other AMR / AMI systems that can utilize the standard 8-digit encoder protocol output.

# SOLID STATE METER (SSM)

Sizes  $\frac{5}{8}$ " x  $\frac{3}{4}$ " and  $\frac{3}{4}$ " Short;  $\frac{3}{4}$ " Long; and 1"

## GENERAL TECHNICAL DATA

	$\frac{5}{8}$ " - $\frac{3}{4}$ " - 1"
Medium Temperature Range	34 ... 122 °F
Ambient Operating Temperature	34 ... 158 °F
Ambient Storage Temperature	-4 ... +140 °F (>90° F max. for one hour)
Maximum Pressure	psi 200
Power Supply	3.6 VDC lithium battery
Battery Lifetime	20 years
Interfaces	Industry standard Encoder protocol, ASCII output for compatibility with all AMR / AMI systems
Data Storage	Alarms and consumption values
Protection Class	IP 68

## TECHNICAL DATA DISPLAY

	$\frac{5}{8}$ " - $\frac{3}{4}$ " - 1"
Display Indication	LCD, 8-digit, Gallon Visual display to 0.1 Gallons and Cubic Foot Display to 0.01 Cubic Feet
Units	Flow and volume (GPM, gal, Ft <sup>3</sup> )
Values Displayed	Volume - flow - reverse flow - water temperatures - display test - error and alarm status - battery lifetime
Values Transmitted	8-digit electronic resolution only

## APPROVAL

	$\frac{5}{8}$ " - $\frac{3}{4}$ " - 1"
NSF	Complies with NSF / ANSI Standard 61, Annex F/G
AWWA	Meets or exceeds applicable sections of the AWWA / ANSI C700 Standards
FCC	Complies with FCC part 15 B

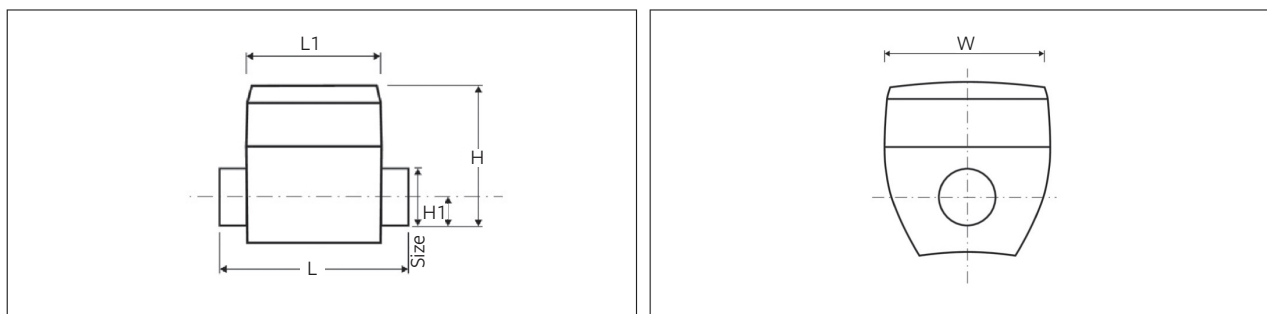
## MATERIAL

	$\frac{5}{8}$ " - $\frac{3}{4}$ " - 1"
Measuring Pipe	Lead-free copper alloy "CUPHIN <sup>®</sup> "
Register Housing	Engineered Polymer
Transducers	Composite
Reflectors	Stainless steel

# SOLID STATE METER (SSM)

Sizes  $\frac{5}{8}$ " x  $\frac{3}{4}$ " and  $\frac{3}{4}$ " Short;  $\frac{3}{4}$ " Long; and 1"

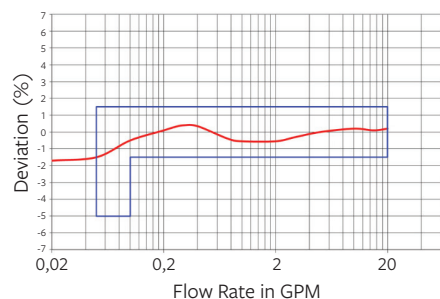
## DIMENSIONS



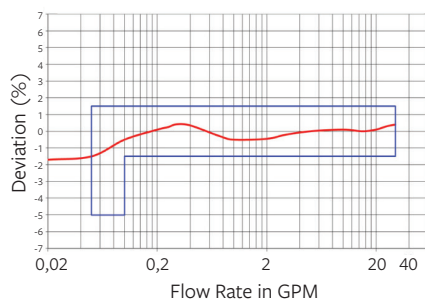
SIZE			$\frac{5}{8}$ " x $\frac{3}{4}$ "	$\frac{3}{4}$ " S	$\frac{3}{4}$ " L	1"
Lay Length	L	Inch	7.5"	7.5"	9.0"	10.75"
Register Length	L1	Inch	3.5"	3.5"	3.5"	3.5"
Register Width	W	Inch	3.7"	3.7"	3.7"	3.7"
Height to Center of Pipe	H	Inch	4.0"	4.0"	4.0"	4.2"
Height to Center of Pipe	H1	Inch	1.3"	1.3"	1.3"	1.4"
Nominal Thread Size			1"-11.5 NPSM	1"-11.5 NPSM	1"-11.5 NPSM	1.25"-11.5 NPSM
Net Weight		Lb.	2.8	2.8	3.1	3.5

## TYPICAL FLOW CHARTS

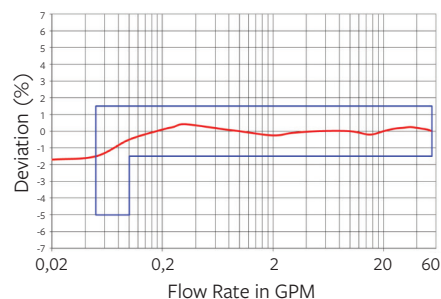
Typical Flow Chart  $\frac{5}{8}$ " Mueller SSM



Typical Flow Chart  $\frac{3}{4}$ " Mueller SSM



Typical Flow Chart 1" Mueller SSM



## TECHNICAL DATA

SIZE			$\frac{5}{8}$ " x $\frac{3}{4}$ "	$\frac{3}{4}$ " S	$\frac{3}{4}$ " L	1"
Lay Length	L	Inch	7.5	7.5	9	10.75
Operating Flow Range		GPM	0.1 - 30	0.1 - 30	0.1 - 30	0.4 - 55
Low Flow Range		GPM	0.05 - 0.1	0.05 - 0.1	0.05 - 0.1	0.25 - 0.4
Operating Range accuracy		%	±1.5	±1.5	±1.5	±1.5
Low Flow Range accuracy		%	-5 / ±1.5	-5 / ±1.5	-5 / ±1.5	-5 / ±1.5
Pressure Loss			2.0 psi at 15 GPM	2.0 psi at 15 GPM	2.0 psi at 15 GPM	1.5 psi at 25 GPM
Operating Performance			In the temperature range of 45 to 85° F, meter consumption measurement is accurate to ±1.5% over the normal flow range (reference: approved test bench, ISO9001 certified).			

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# EXHIBIT N

# MUELLER

## MI.NET® M NODE

### Mi.Node M Meter Mobile / Fixed Meter Interface Unit

#### FEATURES

**Two Way Communications:** The Mueller Mi.Node M meter interface unit provides a direct connection to all Mueller water meters equipped with a Mueller encoder register. The primary function of the Mi.Node transceiver is to provide full, two way communications in either the Mi.Net mobile system or fixed network environment.

**System Components:** Information retrieved from a water meter is stored temporarily within the Mi.Node meter interface unit's internal memory. As a default, the Mi.Node meter interface unit will transmit hourly meter data at a predetermined time once per day to the Multi Network collector in fixed network mode and bubble up every 6 seconds to be read via a mobile collector. On demand reads to the Mi.Node meter interface unit can be requested at any point in time and are typically delivered within seconds. For fixed network applications, this data is sent to a Multi Network Collector (MNC) via an unlicensed radio frequency and then relayed to the Mi.Net system host server for analysis and storage. In a mobile application, the data is retrieved by a vehicle based Mobile Transceiver and that data is then uploaded to the server back at the office. The Mi.Node meter interface unit utilizes advanced noise filtering technology that allow the Mi.Net system to maximize range while keeping infrastructure to a minimum. Multiple routing options for each Mi.Node meter interface unit ensure that the data will be retrieved by the server.

**Construction:** The Mi.Node meter interface unit incorporates multiple moisture barriers to eliminate concerns over moisture intrusion even in meter box environments. An o-ring sealed thermoplastic enclosure, coated electronic board and potting compound provide a watertight package that permits Mueller to offer a 20 year warranty on the Mi.Node meter interface unit. A large lithium ion battery provides plenty of power over the life of the transceiver.

**Scalable and Upgradable:** The various models of Mi.Node meter meter interface unit allow the Mi.Net system to provide robust and efficient AMI, and water conservation solutions for all types of residential and commercial applications.

The Mi.Node meter interface unit's functionality can be upgraded remotely by issuing a broadcast demand. A firmware upgrade made over the Mi.Net system network allows the Mi.Node meter interface unit to be upgraded autonomously. All system Mi.Node transceivers can be scheduled for an upgrade at one time and the system will notify the user when the process is complete.

The Mi.Node meter interface unit seamlessly connects directly to the Mueller Remote Disconnect (RDM) meter for easy but secure actuation of the valve through the user interface and can be actuated in the field or through the AMI network.



#### MATERIALS AND SPECIFICATIONS

Interfaces with most domestic meter manufacturers standard encoded protocol

Logs and stores 105 days of hourly data meter data in internal memory

Automatically detects encoder meter type connected

No external power supply required for operation

Notifies the system of low battery level for preemptive maintenance

RF antenna contained inside Mi.Node meter interface unit enclosure

FCC compliant

Mi.Node wire lengths To Mueller register 5', 25'

Power Source C Cell Lithium Battery

Transmit Frequency 902 MHz – 928 MHz

Data Integrity Verified with every data message

Temperature Range: -40°F to + 158°F (-40°C to + 70°C)

Humidity: 0% - 100% condensing

Dimensions 6 5/8" high x 2 15/16" wide x 3 3/8" deep

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# EXHIBIT O

# Mi.Net<sup>®</sup> Mueller Infrastructure Network

**Mueller** SYSTEMS

## Mi.Net Mobile Transceiver

### Features

**APPLICATIONS:** The Mueller Systems **Mi.Net** Mobile Transceiver is a high performance, vehicle based AMR/AMI transceiver. It is designed to collect water meter data via radio frequency while driving a meter route at posted speed limits in AMR mode. When used in conjunction with the **Mi.Net** AMI system, the Mobile Transceiver can be used as a disaster recovery device to obtain meter data from stranded assets. The complete **Mi.Net** Mobile hardware package includes the radio transceiver, magnetic antenna, and all cable connections. Implementation of a mobile meter reading solution like **Mi.Net** Mobile ensures significant performance improvements in reading efficiency, data collection, customer satisfaction and cash flow for utilities.

**OPERATION:** The **Mi.Net** Mobile Transceiver can be temporarily or permanently mounted in any vehicle. Once initialized, it operates quietly in the background and transfers data to a computer of the customer's choice. The **Mi.Net** Mobile Transceiver can also provide full two way communication to actuate remote disconnect meters (RDMs), initiate data logging, and meter right sizing. The **Mi.Net** Mobile Transceiver receives data on multiple discreet frequencies for secure and reliable data processing. During the reading process, the technician can view a number of route progress screens which include route mapping with representations of all meter locations, tabular screens depicting all meters, meters remaining to be read, collected meter readings and route performance overview. At the end of the collection period, the data is uploaded via the EZ Reader™ route management software into the utility's billing software with just a few clicks of a mouse. A standard series of reports are available for viewing performance of the system, the status of all event and duration codes, battery health, and past high leaks and backflow events.

**PERFORMANCE:** The **Mi.Net** Mobile Transceiver receives power via the vehicle auxiliary power outlet and a USB connection provides data interchange with the laptop. A sensitive magnetic antenna mounted on the vehicle's roof provides the basis for all radio frequency (RF) communication with Mueller Systems radios. Meter information is received and processed as it is transmitted to ensure continuous high performance data capture on multiple receiver channels of the **Mi.Net** Mobile Transceiver. The meter reader collects all RF data by simply driving past the meters equipped with Mueller Systems legacy Hot Rod transmitters or Mi.Node M units. The system also provides the option of a complete two way interface for transmission of commands to Mi.Node M radios.

**CONFORMANCE TO STANDARDS:** The system is FCC Certified for operation in the United States. It is fully compliant with FCC Part 15 and no FCC license is required for operation.

**CONSTRUCTION:** The **Mi.Net** Mobile Transceiver is small, lightweight and encased in a rugged metal enclosure for protection. All internal electronics are shielded against electro-magnetic interference. Connection to the laptop, antenna, and power are accomplished on the front of the unit. All connections are clearly marked for operational efficiency and ease of installation. LED lights on the front of the unit confirm power, RF reception, and temperature status.



Mi.Net Mobile Transceiver

Mi.Net Mobile Transceiver

### Materials and Specifications

<b>RADIO FREQUENCY</b>	Operates on 902 to 928MHz (No FCC license required)
<b>PC OPERATING SYSTEM</b>	Windows 7 or newer
<b>OPERATING SOFTWARE</b>	EZ Reader Route Management Suite
<b>STANDARDS</b>	FCC Part 15, CSA, and ROHS
<b>RECEIVER POWER SUPPLY</b>	Powered via vehicle power outlet; 12VDC
<b>RECEIVER DIMENSIONS</b>	L: 9.5" W: 8.4" H: 3.5"
<b>RECEIVER WEIGHT</b>	6 lbs (approximately)
<b>ANTENNA HEIGHT</b>	35" Magnetic Mount
<b>TWO WAY COMMUNICATION</b>	FCC LICENSE EXEMPT
<b>OPTIONS</b>	VESA Vehicle Mounting Bracket
<b>OPERATING TEMPERATURE</b>	-40°F to + 122°F (-20°C to + 50°C)
<b>STORAGE TEMPERATURE</b>	-40°F to + 176°F (-20°C TO + 80°C)





# Mi.Net

## Mueller Infrastructure Network

### Mi.Net Mobile Transceiver

#### Mi.Net Mobile Transceiver Dimensions

